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More scientific news from ACS meeting

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CHEMICAL & ENGINEERING
NEWS

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News of the Week

■ **Although the extent of damage caused by the Chernobyl nuclear power-plant accident in the U.S.S.R. is unknown, it is considered the worst disaster in nuclear power-plant history.** **Page 4**

■ **Hazardous waste facilities given low marks in Council on Economic Priorities study.** **Page 5**

■ **Yelena Bonner tells NAS, AAAS of husband Andrei Sakharov's ill treatment by Soviets, urges protests on behalf of dissidents.** **Page 5**

■ **"World Resources 1986" points up gaps in data on many aspects of the environment, resources.** **Page 6**

■ **National Academy of Sciences elects 59 new members, including a number of chemists.** **Page 6**

Business

Sales and operating profits for most of C&EN's Top 100 companies declined in 1985; market research plays key role in Union Carbide's specialty chemicals division. **Page 9**

Government

Chemical industry is working with arms control agency in efforts to develop methods for monitoring critical chemicals. **Page 18**

From ACS New York meeting: crisis for low-level radioactive waste disposal; better control of drug residues in meat. **Page 20**

Science

ACS meeting in New York: renin inhibitors as antihypertensive agents; synthesis of new antiviral agent; metal complexes with molecular hydrogen coordination; radon/lung cancer connection; MPTP and Parkinson's disease; bis(arene) complexes. **Page 23**

Education

From New York meeting: CPT's 50th anniversary symposium devoted to changing needs in field of education. **Page 32**

Technology

From New York meeting: research on polydiacetylenes; tribochemical explanations of wear phenomena; nitrosamines in meat from rubber netting; fiber-optic sensor to determine sodium; reverse osmosis for seawater desalination; industrial separation technology; swellable gels for separation process; catalytic templates to control reactions; acetic acid from syngas; fluorescence method to enhance LC analysis. **Page 33**

ACS News

ACS national meeting in New York: councilors realign society's six electoral regions, increase membership dues. **Page 60**

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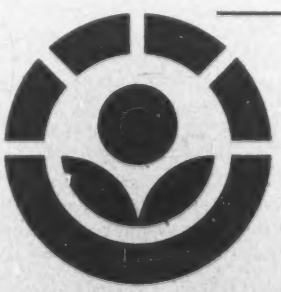


Special Report

Food irradiation has been studied for years, but now with new FDA approval of low-dose radiation, it may become a popular method to retard food spoilage. **Page 46**

Top 100 Chemical Producers: 1985 Sales, Profits Decline for Most

Of 100 largest companies, 54 reported lower sales, 50 lower operating profits from chemicals last year compared with 1984

William J. Storck, David Webber
C&EN New York

The all-but-moribund agriculture business and shrinking oil prices helped keep sales volume down and the marketplace resistant to chemical product price increases last year. With those and other factors offsetting improvements in other sectors of the economy, sales and operating profits from chemical operations at the 100 biggest chemical producers mostly declined in 1985.

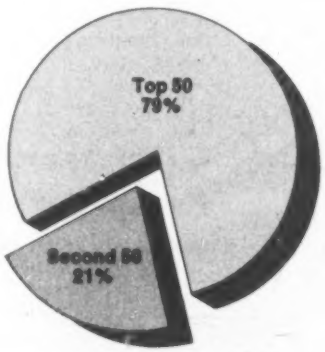
Of the 50 largest members of C&EN's list of the Top 100 chemical producers, 30 recorded lower chemical sales and 33 lower chemical operating profits as a percentage of total operating profits in 1985 compared with 1984. In the group comprising the smaller 50 chemical producers on the list, 24 reported a decline in chemical sales and 23 had a drop in chemical operating profits as a share of total operating profits. Chemical operating profit is calculated by subtracting administrative expenses and cost of sales from chemical sales.

Despite some trading of places, the same companies comprised the top 10 members of the list in terms of chemical sales in 1985 as in 1984. Du Pont continued to head the list, although its lead over second-place Dow Chemical shrank considerably. In 1985, Du Pont's chemical sales dropped 6.3%, and Dow's fell just 0.9%. On the other hand, Du Pont's chemical operating profit, down 21.4% from 1984's $1.11 billion, declined less than did Dow's, down 44.5% from the previous year's $741 million.

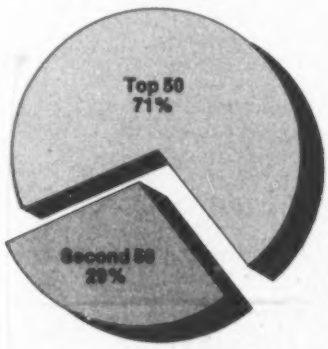
Atlantic Richfield moved up to sixth place from eighth on the list at the expense of Shell Oil, which dropped a notch to seventh, and Celanese, which also moved down a notch to eighth in terms of chemical sales. Amoco and W. R. Grace traded places on the list, with Amoco rising to ninth while Grace subsided to 10th.

A number of new entries appear on this year's Top 100 list of chemical producers. Chesebrough-Pond's, for instance, became a chemical producer for the first time last year with its acquisition of Stauffer Chemical. The company joins the ranking in 35th place. In 1984, Stauffer, which has suffered greatly from the agriculture slump, was ranked 22nd. Among other new qualifiers for the list in 1985 are Vista Chemicals, 61st in size, formed by the leveraged buyout of the

Large firms dominate sales, to lesser extent earnings . . .

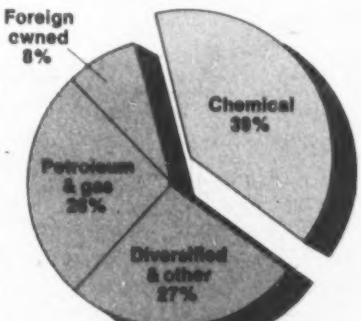


1985 sales = $126 billion



1985 operating profits = $9.1 billion

. . . and chemical firms prevail among types of companies



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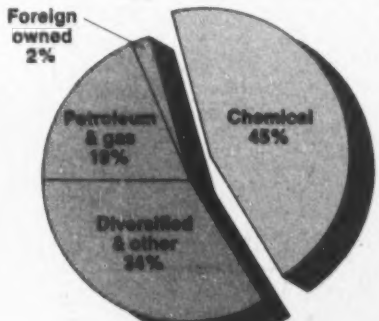

1985 operating profits = $9.1 billion

Restructuring, mergers changed many rankings in 1985

Rank 1985	Rank 1984		Chemical sales 1985 ($ millions)	Change from 1984	Chemical sales as % of total sales	Industry classification	Chemical operating profits[a] ($ millions)	Change from 1984	Chemical operating profits as % of total operating profits	Operating profit margin[b]	Identifiable chemical assets ($ millions)	Chemical assets as % of total assets	Operating return on chemical assets[c]
1	1	Du Pont	$11,250	−6.3%	38.2%	Diversified	$870	−21.4%	22.0%	7.7%	$7885	34.3%	11.0%
2	2	Dow Chemical	9,508	−0.9	62.4	Basic chemicals	411	−44.5	64.5	4.3	8047	68.0	5.1
3	3	Exxon	6,670	−2.9	7.3	Petroleum	385	−43.1	3.5	5.8	5337	7.7	7.2
4	4	Monsanto	5,203[d]	−12.6	77.1	Basic chemicals	477	−26.7	135.9	9.2	4217	47.5	11.3
5	5	Union Carbide	3,961	−4.7	44.0	Basic chemicals	413	−14.0	50.0	10.4	4330	44.7	9.5
6	8	Atlantic Richfield	3,804	21.0	16.9	Petroleum	73[e]	−49.3	4.9	1.9	2296	11.3	3.2
7	6	Shell Oil	3,318	−1.9	16.3	Petroleum	165	−39.6	5.2	5.0	3891	14.7	4.2
8	7	Celanese	3,046	−8.5	100.0	Basic chemicals	127	−53.3	100.0	4.2	2809	100.0	4.5
9	10	Amoco	2,905	2.5	10.1	Petroleum	473	35.5	11.5	16.3	2334	9.3	20.3
10	9	W. R. Grace	2,868	0.7	39.5	Specialty chemicals	234	−30.8	58.4	8.2	1997	36.8	11.7
11	34	Chevron	2,611	137.4	6.0	Petroleum	−183	def	def	def	3010	7.7	def
12	32	BASF	2,600[d]	14.0	100.0	Basic chemicals	na	na	na	na	na	na	na
13	11	Eastman Kodak	2,348	−4.7	22.1	Photo equipment	183	−34.9	32.6	7.8	2136	17.6	8.6
14	15	General Electric	2,347	10.9	8.0	Electrical products	466	−0.9	13.2	19.9	3876	14.7	12.0
15	13	Phillips Petroleum	2,266	−3.6	14.5	Petroleum	219	−0.9	8.0	9.7	1315	9.4	16.7
15	14	Mobil	2,266	−3.6	3.7	Petroleum	81	42.1	1.3	3.6	2045	4.9	4.0
17	12	Allied-Signal	2,055	−15.5	22.5	Diversified	195	−15.6	21.8	9.5	1979	14.9	9.9
18	16	Rohm & Haas	1,968	0.2	95.9	Basic chemicals	270	−18.9	99.3	13.7	1381	98.9	19.6
19	17	American Cyanamid	1,830	−3.6	51.8	Basic chemicals	81	−40.2	32.1	4.4	1254	54.6	6.4
20	18	Hercules	1,743	−4.4	67.8	Basic chemicals	47	−63.6	35.9	2.7	1409	53.0	3.3
21	19	Air Products[f]	1,674	4.4	91.5	Basic chemicals	312	6.9	114.3	18.6	1937	74.7	16.1
22	37	Occidental Petroleum	1,621[g]	64.6	10.4	Petroleum	100	45.4	5.5	6.2	1721	14.9	5.8
23	24	Mobay	1,599	3.0	100.0	Basic chemicals	150	11.2	100.0	9.4	1215	100.0	12.4
24	20	Ciba-Geigy	1,540	−1.3	64.2	Specialty chemicals	na	na	na	na	na	na	na
25	26	Borden	1,532	5.8	32.5	Dairy products	129	−24.1	32.4	8.4	1336	47.4	9.6
26	23	Ashland Oil	1,499	−0.1	18.3	Petroleum	98	23.6	18.3	4.5	496	12.6	13.7
27	27	B. F. Goodrich	1,384	−2.8	43.2	Rubber products	79	−30.4	51.1	5.7	1154	51.1	6.9
28	25	American Hoechst	1,361[d]	−7.3	80.4	Basic chemicals	na	na	na	na	na	na	na
29	31	FMC	1,261	2.0	38.7	Machinery	143	−23.5	59.2	11.4	1260	46.8	11.4
30	28	Ethyl	1,242	−9.0	60.3	Basic chemicals	198	4.2	84.3	16.0	768	49.4	25.8
31	21	Texaco	1,220	−20.7	2.6	Petroleum	12	−89.2	0.3	1.0	1010	2.7	1.2
32	28	U.S. Steel	1,217	−9.7	6.3	Steel	−1	def	def	def	587	3.2	def
32	30	Unocal	1,217	−2.6	10.8	Petroleum	58[e]	−33.3	17.8	4.8	772	7.2	7.5
34	33	Olin	1,147	−2.3	65.5	Basic chemicals	48	−24.5	44.3	4.0	825	51.6	5.6
35	—	Chesebrough-Pond's	1,079	nm	40.0	Diversified	60	nm	27.7	5.6	1771	58.9	3.4
36	38	International Minerals[h]	1,057	8.1	61.2	Agrichemicals	135	−7.7	62.8	12.7	1285	65.6	10.5
37	42	National Distillers	1,037	−4.0	45.3	Alcoholic beverages	72	−29.6	37.7	6.9	746	36.9	9.6
38	39	Borg-Warner	929	−1.6	27.9	Auto equipment	122	0.8	35.8	13.2	437	15.5	28.0
39	40	CF Industries	921[d]	1.4	100.0	Agrichemicals	−1	def	def	def	936	100.0	def
40	42	Dow Corning	901	5.4	100.0	Specialty chemicals	95[e]	4.3	100.0	10.6	na	na	na
41	57	National Starch	881	nm	100.0	Specialty chemicals	66	20.0	100.0	7.5	655	100.0	10.1
42	36	PPG Industries	841	−15.3	19.4	Glass products	80	−34.0	17.9	9.5	1129	27.6	7.1
43	46	Reichhold Chemicals	823	2.6	100.0	Basic chemicals	21	−51.6	100.0	2.6	492	100.0	4.3
44	43	Lubrizol	804	−3.4	89.0	Specialty chemicals	93	−8.4	97.5	11.6	603	70.6	15.5
45	44	Williams Cos.	742	−10.7	23.6	Agrichemicals	−16	def	def	def	553	12.8	def
46	45	Diamond Shamrock	736	−10.3	17.9	Petroleum	121	4.1	33.9	16.5	791	17.1	15.3
47	47	Farmland Industries	721	−8.0	24.2	Agricultural supplies	3	−91.5	3.8	0.4	407	31.7	0.7
48	48	Eli Lilly	713	−5.8	21.8	Drugs	88	−18.4	10.7	12.4	812	20.5	10.9
48	59	Cabot[e]	712	31.4	50.6	Specialty metals	88	31.8	43.5	12.4	482	30.2	18.3
50	52	Nalco Chemical	682	2.7	100.0	Specialty chemicals	122	5.6	100.0	17.8	542	100.0	22.4

Rank 1985	Rank 1984		Chemical sales 1985 ($ millions)	Change from 1984	Chemical sales as % of total sales	Industry classification	Chemical operating profits[a] ($ millions)	Change from 1984	Chemical operating profits as % of total operating profits	Operating profit margin[b]	Identifiable chemical assets ($ millions)	Chemical assets as % of total assets	Operating return on chemical assets[c]
51	53	Pennwalt	$680	3.8%	67.1%	Basic chemicals	$ 59	13.9%	72.3%	8.7%	$612	63.9%	9.7%
52	41	Koppers	619	−30.1	44.2	Diversified	−62	def	def	def	373	35.0	def
53	54	Morton Thiokol[h]	616	−5.8	33.8	Diversified	90	10.7	37.6	14.6	543	39.7	16.5
54	58	Engelhard	598	8.8	26.4	Specialty metals	62	−6.1	72.9	10.4	528	56.4	11.7
55	70	Enron	581	46.6	5.7	Natural gas	34	−26.6	5.5	5.9	590	6.0	5.8
56	72	Terra Chemicals	574	55.1	100.0	Agrichemicals	na	na	na	na	na	na	na
56	56	Witco	574	−7.9	39.6	Specialty chemicals	57	−12.6	49.5	9.9	265	32.7	21.4
58	63	NL Industries	564	19.3	39.6	Petroleum services	127	33.9	105.8	22.5	397	24.9	32.0
59	50	Standard Oil (Ohio)	552	−21.9	4.0	Petroleum	27	−36.6	0.9	4.9	549	3.0	4.9
60	74	SCM[h]	539[d]	48.4	24.8	Paint	74	99.8	59.5	13.7	483	35.5	15.3
61	—	Vista Chemicals[e]	521	nm	100.0	Basic chemicals	na	na	na	na	na	na	na
62	76	Solvay America	515	nm	100.0	Basic chemicals	na	na	na	na	na	na	na
63	64	Polysar	513	16.6	100.0	Basic chemicals	na	na	na	na	na	na	na
64	62	International Flavors	501	5.1	100.0	Specialty chemicals	118	1.5	100.0	23.5	560	100.0	21.0
65	60	Kerr-McGee	483	−7.1	14.4	Petroleum	47	def	11.9	9.7	567	15.3	8.3
66	68	Liquid Air	459	7.8	84.6	Basic chemicals	58	10.7	94.0	12.6	na	na	na
67	65	H. B. Fuller[i]	457	2.4	100.0	Specialty chemicals	31	−4.5	100.0	6.7	246	100.0	12.5
68	61	Freeport-McMoRan	451	−8.5	62.5	Agrichemicals	105	−4.5	70.3	23.3	215	10.5	48.8
69	55	Merck	450	−29.8	12.7	Drugs	58	−25.4	6.8	13.0	369	7.5	15.8
70	79	Big Three Industries	411	21.1	49.3	Petroleum services	104	38.3	75.8	25.4	594	55.6	17.6
71	81	American Petrofina	405	27.3	16.8	Petroleum	12	−42.1	def	2.9	314	17.9	3.7
72	69	Sun Co.	402	−4.8	2.8	Petroleum	na	na	na	na	na	na	na
73	72	Rhône-Poulenc	400	8.1	100.0	Specialty chemicals	na	na	na	na	na	na	na
74	71	Pfizer	392	6.6	9.7	Drugs	17	280.0	1.8	4.4	400	9.0	4.3
75	78	Tyler	375	8.4	41.1	Diversified chemicals	30	−61.5	0.1	7.9	174	36.7	17.0
76	75	GAF	364	2.0	49.8	Specialty chemicals	93	17.2	81.4	25.4	217	24.7	42.6
77	81	Chemed	336	5.9	90.3	Specialty chemicals	43	3.8	88.6	12.8	159	69.3	27.1
78	77	Mississippi Chemical	325	−6.8	100.0	Farm cooperative	3	−32.3	100.0	0.9	320	100.0	0.9
79	83	Betz Laboratories	319	5.1	100.0	Specialty chemicals	61	0.3	100.0	19.0	254	100.0	23.9
80	84	Vulcan Materials	292	−3.2	30.1	Nonmetallic minerals	24	−48.4	18.8	8.3	na	na	na
81	85	Petrolite[j]	290	2.1	93.9	Specialty chemicals	36	−11.0	106.1	12.4	170	74.4	21.2
82	—	Dexter	281	−2.1	44.4	Specialty materials	28	−8.7	42.2	10.0	150	30.9	18.9
83	86	Great Lakes Chemical	277	−0.5	100.0	Specialty chemicals	45	−19.8	100.0	16.4	na	na	na
84	—	Union Camp	275	−7.0	14.7	Wood products	9	−56.4	7.2	3.2	207	7.8	4.3
84	87	Aluminum Co. of America	271	−0.7	5.3	Nonferrous metals	na	na	na	na	na	na	na
86	87	Ferro	267[d]	−1.9	41.1	Specialty materials	14	−14.4	37.0	5.1	143	36.4	9.6
87	90	Emhart	257	−1.6	14.5	Machinery	19	−17.4	10.6	7.4	132	8.6	14.4
88	91	Kaiser Aluminum	255	2.3	12.6	Nonferrous metals	8	−80.0	def	3.1	275	8.4	2.8
89	93	Stepan	236	0.4	100.0	Specialty chemicals	9	51.3	100.0	3.9	139	100.0	6.6
90	92	Loctite	231	−4.2	100.0	Specialty chemicals	35	−19.0	100.0	15.1	219	100.0	15.9
91	—	Lonza	197	9.0	100.0	Specialty chemicals	na	na	na	na	na	na	na
92	66	Georgia-Pacific	173	−61.2	3.9	Wood products	na	na	na	na	na	na	na
93	95	Essex Chemical	172	−2.2	90.6	Basic chemicals	32	18.5	118.5	18.6	94	66.7	33.9
94	—	Millmaster Onyx	170	0.0	100.0	Specialty chemicals	na	na	na	na	na	na	na
95	99	Sigma-Aldrich	165	19.4	76.7	Specialty chemicals	47	21.0	89.3	28.6	157	84.1	30.1
96	96	Agway	162	−2.7	4.0	Farm cooperative	na	na	na	na	na	na	na
97	97	First Mississippi	151	−8.6	55.2	Agrichemicals	31	11.0	81.4	20.6	68	17.3	45.4
98	—	UGI	117	3.5	19.4	Natural gas	0	−90.0	def	0.1	133	21.4	0.1
99	100	Crompton & Knowles	113	−2.1	48.7	Specialty chemicals	12	−8.2	58.6	11.0	73	55.8	17.2
100	—	Lawter Chemicals	97	−1.7	100.0	Specialty chemicals	13	−38.1	100.0	13.7	84	100.0	15.7

a Operating profit is sales less administrative expenses and cost of sales. b Operating profit from chemicals as a percentage of chemical sales. c Chemical operating profit as a percentage of identifiable chemical assets. d Chemical sales include significant amounts of nonchemical products. e Chemical net profits. f Fiscal year ended Sept. 30. g Does not include all chemical sales. h Fiscal year ends June 30. i Fiscal year ends Nov. 30. j Fiscal year ends Oct. 31. na = not available. nm = not meaningful. def = deficit.

C&EN's five-way ranking of the Top 100 chemical producers

$ Millions	Chemical sales	Rank		Chemical operating profits	Rank		Chemical operating profit margin	Rank		Identifiable chemical assets	Rank		Return on chemical assets	Rank	
	1985	1985	1984	1985	1985	1984	1985	1985	1984	1985	1985	1984	1985	1985	1984
Agway	$ 162	96	96	na	—	—	na	—	—	na	—	—	na	—	—
Air Products	1,674	21	19	$ 312	8	10	18.6%	10	12	$1937	16	14	16.1%	24	26
Allied-Signal	2,055	17	13	195	13	14	9.5	39	47	1979	15	18	9.9	44	25
Aluminum Co. of America	271	85	87	na	—	—	na	—	—	na	—	—	na	—	—
American Cyanamid	1,830	19	17	81	34	21	4.4	64	60	1254	25	23	6.4	57	51
American Hoechst	1,361	28	25	na	—	—	na	—	—	na	—	—	na	—	—
American Petrofina	405	71	81	12	71	73	2.9	73	63	314	61	60	3.7	69	67
Amoco	2,905	9	10	473	3	7	16.3	15	30	2334	70	11	20.3	15	29
Ashland Oil	1,499	26	23	68	40	50	4.5	63	75	496	50	46	13.7	32	49
Atlantic Richfield	3,804	6	8	na	—	19	na	—	71	2296	11	8	na	—	71
BASF	2,600	12	32	na	—	66	na	—	76	na	—	—	na	—	—
Betz Laboratories	319	79	83	61	43	46	19.0	9	10	254	64	65	23.9	10	8
Big Three Industries	411	70	79	104	27	39	25.4	2	4	594	40	44	17.6	19	41
Borden	1,532	25	26	129	19	18	8.4	44	40	1336	21	19	9.6	46	42
Borg-Warner	929	38	39	122	22	25	13.2	22	27	437	54	54	28.0	7	5
CF Industries	921	39	40	−1	80	51	def	—	66	936	30	26	def	—	70
Cabot	712	49	59	88	32	42	12.4	27	28	482	52	63	18.3	18	13
Celanese	3,046	8	7	127	20	13	4.2	67	53	2809	9	7	4.5	63	58
Chemed	336	77	81	43	55	59	12.8	24	26	159	72	77	27.1	6	7
Chesebrough-Pond's	1,079	35	—	60	44	—	5.6	58	—	1771	17	—	3.4	70	—
Chevron	2,611	11	34	−163	84	—	def	—	—	3010	8	31	def	—	—
Ciba-Geigy	1,540	24	20	na	—	—	na	—	—	na	—	—	na	—	—
Crompton & Knowles	113	99	100	12	71	78	11.0	32	37	73	81	85	17.2	20	19
Dexter	281	82	—	28	63	—	10.0	35	—	150	74	—	18.9	17	—
Diamond Shamrock	736	46	45	121	24	26	16.5	13	22	791	33	34	15.3	29	30
Dow Chemical	9,508	2	2	411	6	2	4.3	66	58	8047	1	1	5.1	61	55
Dow Corning	901	40	42	na	—	—	na	—	—	na	—	—	na	—	—
Du Pont	11,250	1	1	870	1	1	7.7	49	50	7885	2	2	11.0	40	33
Eastman Kodak	2,348	13	12	183	14	11	7.8	48	42	2136	12	12	8.6	50	38
Eli Lilly	713	48	48	88	32	32	12.4	27	22	812	32	33	10.9	41	36
Emhart	257	87	90	19	67	72	7.4	51	51	132	78	83	14.4	31	18
Engelhard	598	54	58	62	42	43	10.4	39	37	528	49	52	11.7	35	31
Enron	581	55	70	34	58	54	5.9	55	36	590	41	39	5.8	58	62
Essex Chemical	172	93	95	32	59	70	18.6	10	18	94	79	83	33.9	4	13
Ethyl	1,242	30	28	198	12	16	16.0	16	25	768	35	32	25.8	9	15
Exxon	6,670	3	3	385	7	3	5.8	56	46	5337	3	3	7.2	53	43
FMC	1,261	29	31	143	17	17	11.4	31	19	1260	24	29	11.4	38	22
Farmland Industries	721	47	47	3	77	67	0.4	78	74	407	55	50	0.7	75	65
Ferro	267	86	87	14	69	76	5.1	59	67	143	75	79	9.6	46	47
First Mississippi	151	97	97	31	60	69	20.6	7	13	68	82	85	45.4	2	4
Freeport-McMoRan	451	68	61	105	26	30	23.3	5	3	215	68	69	48.8	1	1
H. B. Fuller	457	67	65	31	60	67	6.7	53	59	246	65	67	12.5	33	35
GAF	364	76	75	93	29	37	25.4	2	7	217	67	70	42.6	3	3
General Electric	2,347	14	15	466	4	6	19.9	8	8	3876	7	9	12.0	35	20
Georgia-Pacific	173	92	66	na	—	87	na	—	—	na	—	75	na	—	—
B. F. Goodrich	1,384	27	27	79	37	29	5.7	57	56	1154	27	17	6.9	55	59
W. R. Grace	2,868	10	9	234	10	8	8.2	46	37	1997	14	13	11.7	36	21
Great Lakes Chemical	277	83	86	45	54	49	16.4	14	8	na	—	61	na	—	20
Hercules	1,743	20	18	47	50	22	2.7	74	60	1409	19	20	3.3	71	56
International Flavors	501	64	62	118	25	26	23.5	4	2	560	44	55	21.0	14	11

$ Millions	Chemical sales	Rank		Chemical operating profits	Rank		Chemical operating profit margin	Rank		Identifiable chemical assets	Rank		Return on chemical assets	Rank	
	1985	1985	1984	1985	1985	1984	1985	1985	1984	1985	1985	1984	1985	1985	1984
International Minerals	$1,057	36	38	$135	18	20	12.7%	25	20	$1285	23	21	10.5%	42	48
Kaiser Aluminum	255	88	91	8	76	61	3.1	72	16	275	62	63	2.8	72	37
Kerr-McGee	483	65	60	47	50	86	9.7	37	—	567	43	42	8.3	51	—
Koppers	619	52	41	−62	83	74	def	—	81	373	58	49	def	—	75
Lawter International	97	100	—	13	70	—	13.7	19	—	84	80	—	15.7	27	—
Liquid Air	459	66	68	58	46	52	12.6	26	34	na	—	—	na	—	—
Loctite	231	90	92	35	57	58	15.1	17	11	219	66	66	15.9	26	23
Lonza	197	91	—	na	—	—	na	—	—	na	—	—	na	—	—
Lubrizol	604	44	43	93	29	33	11.6	30	30	603	39	37	15.5	28	34
Merck	450	69	55	58	46	38	13.0	23	34	369	59	41	15.8	26	41
Millmaster Onyx	170	94	—	na	—	—	na	—	—	na	—	—	na	—	—
Mississippi Chemical	325	78	77	3	77	83	0.9	77	82	320	60	57	0.9	74	79
Mobay	1,599	23	24	150	16	—	9.4	41	—	1215	26	—	12.4	34	—
Mobil	2,266	15	11	81	34	47	3.6	70	79	2045	13	10	4.0	68	78
Monsanto	5,203	4	4	477	2	4	9.2	42	43	4217	5	4	11.3	39	40
Morton Thiokol	616	53	54	90	31	36	14.6	18	28	543	47	47	16.5	23	27
NL Industries	564	58	63	127	20	35	22.5	6	9	397	57	62	32.0	5	5
Nalco Chemical	882	50	52	122	22	28	17.8	12	12	542	48	48	22.4	11	15
National Distillers	1,037	37	35	72	39	33	6.9	52	46	746	36	35	9.6	46	39
National Starch	861	41	57	66	41	—	7.5	50	—	655	37	—	10.1	43	—
Occidental Petroleum	1,621	22	37	100	28	40	6.2	54	62	1721	18	28	5.8	58	66
Olin	1,147	34	33	46	53	45	4.0	68	70	825	31	25	5.6	60	70
PPG Industries	841	42	36	80	36	24	9.5	39	30	1129	28	24	7.1	54	51
Pennwalt	680	51	53	59	45	52	8.7	43	57	612	38	45	9.7	45	53
Petrolite	290	81	85	36	56	60	12.4	27	22	170	71	73	21.2	13	14
Pfizer	392	74	71	17	68	82	4.4	64	82	400	56	53	4.3	64	80
Phillips Petroleum	2,266	15	14	219	11	15	9.7	37	48	1315	22	16	16.7	22	32
Polysar	513	63	64	na	—	—	na	—	—	na	—	—	na	—	—
Reichhold Chemicals	823	43	46	21	66	56	2.6	75	69	492	51	56	4.3	64	45
Rhône-Poulenc	400	73	72	na	—	—	na	—	—	na	—	—	na	—	—
Rohm & Haas	1,966	18	18	270	9	9	13.7	19	14	1381	20	22	19.6	16	10
SCM	539	60	74	74	38	64	13.7	19	45	483	52	59	15.3	29	48
Shell Oil	3,318	7	6	165	15	12	5.0	60	55	3891	6	6	4.2	67	61
Sigma-Aldrich	165	85	99	47	50	63	28.6	1	1	157	73	72	30.1	6	9
Solvay America	515	62	76	na	—	—	na	—	—	na	—	—	na	—	—
Standard Oil (Ohio)	552	59	50	27	64	56	4.9	61	64	549	46	38	4.9	62	67
Stepan	236	89	93	9	74	81	3.9	69	77	139	76	80	6.6	56	73
Sun Co.	402	72	69	na	—	—	na	—	—	na	—	—	na	—	—
Terra Chemicals	574	56	72	na	—	—	na	—	—	na	—	—	na	—	—
Texaco	1,220	31	21	12	71	61	1.0	76	78	1010	29	27	1.2	73	76
Tyler	375	75	78	30	62	80	7.9	47	79	174	70	74	17.0	21	2
U.S. Steel	1,217	32	26	−1	80	47	def	—	84	587	42	40	def	—	57
UGI	117	98	—	0	79	—	0.1	79	—	133	77	—	0.1	76	—
Union Camp	275	84	—	9	74	—	3.2	71	—	207	69	—	4.3	64	—
Union Carbide	3,961	5	5	413	5	5	10.4	33	41	4330	4	5	9.5	49	53
Unocal	1,217	32	30	58	46	—	4.8	62	—	772	34	36	7.5	52	—
Vista Chemical	521	61	—	na	—	—	na	—	—	na	—	—	na	—	—
Vulcan Materials	292	80	84	24	65	54	8.3	45	16	na	—	—	na	—	—
Williams Cos.	742	45	44	−16	82	41	def	—	53	553	45	30	def	—	64
Witco	574	55	58	57	49	44	9.9	36	44	265	63	65	21.4	12	18

Note: Companies with negative profitability and those giving only net profits are not ranked. There are 84 companies ranked for operating profit, 79 for operating profit margin, 82 ranked by assets, and 76 ranked for return on assets. Companies not included in 1984's listing are not ranked for that year. **na** = not available. **def** = deficit.

Smaller producers fare better than do larger firms

Ending a period of two consecutive years in which the 50 largest companies among C&EN's Top 100 chemical producers outperformed the 50 smaller firms, the group of smaller companies did better in 1985.

Last year's economic problems afflicted the 50 largest firms more severely, because those companies are largely makers of cyclical, large-volume commodity chemicals. The Second 50 chemical producers, on the other hand, are mainly manufacturers of chemical specialties.

As a result, composite chemical sales by the Top 50 group declined to about $107 billion in 1985, down 0.4% from 1984. By comparison, composite chemical sales for the Second 50 rose to $1.8 billion, up 3.9% from the 1984 aggregate total. For the entire Top 100 chemical producers roster, chemical sales in 1985 amounted to $125 billion, up a scant 0.2% from the composite total for 1984.

The Second 50 group's composite chemical operating profits did decline in 1985, but by much less than did those for the Top 50 companies. For the largest producers, composite chemical operating profits tumbled 24% to $7.4 billion last year. For the smaller producers, chemical operating profits fell to $1.6 billion, down a little more than 4% from their total in 1984. For the Top 100, composite chemical operating profits came to $9 billion, down a substantial 21% from the year before.

At the same time, total identifiable chemical assets increased in all three company categories. For the Top 50 companies, the value of chemical assets climbed 6% from 1984 to $84.5 billion. The Second 50 group added $10.8 billion to its base of identifiable chemical assets. This was a 2.8% increase from 1984. And for the entire Top 100 list of chemical producers, identifiable chemical assets increased 5.6% to a composite $95.3 billion.

	Top 50		Second 50		Total 100	
$ Billions	1985	% change	1985	% change	1985	% change
Chemical sales	$106.6	−0.4%	$ 1.8	3.9%	$125.0	0.2%
Chemical operating profits	7.4	−23.9	1.6	−4.3	9.0	−21.0
Chemical assets	84.5	6.0	10.8	2.8	95.3	5.6

Note: Excludes companies lacking comparative data.

chemical operations of Du Pont's Conoco unit; Lonza, 91st in size; Millmaster Onyx, 94th on the list; and Lawter Chemicals, 100th.

Two other firms, which qualified to appear in the 1984 ranking but were not listed because data were lacking at the time of publication, now join the list. They are Betz Laboratories, ranked 79th, and Sigma-Aldrich, ranked 95th. Although those companies were not included in last year's Top 100 list (C&EN, May 6, 1985, page 15), they were included in a revised list in C&EN's Facts & Figures of the Chemical Industry issue (C&EN, June 10, 1985, page 22).

Dropped from the list this year are Uniroyal, which was taken private in a leveraged buyout during 1985 and no longer reports consistent data; Avon Products, which sold its Mallinckrodt division (Avon's only chemical operation) to International Minerals & Chemical; and Sterling Drug, which has changed its method of accounting and no longer breaks out chemical data.

As usual, a number of companies with large chemical segments do not appear on the list because they fail to disclose chemical data. Prominent among such chemical producers are ICI Americas and Procter & Gamble.

As in last year's Top 100 report, except where there were massive reorganizations, companies in the 1985 ranking are compared with their rankings of a year ago, instead of rankings based on restated results in the current annual report. Thus, a rise or fall in rank may well reflect acquired or divested chemical businesses as well as increasing or decreasing sales from operations.

C&EN ranks the Top 100 chemical producers five ways. Du Pont, the leader in terms of chemical sales, is also the leader in terms of chemical operating profits. The company with the second highest chemical sales is Dow Chemical; the company with the second highest chemical operating profits is Monsanto, which moved up from fourth position in 1984. Dow, second in operating profits in 1984, fell to sixth place in 1985. In terms of chemical operating profit margin, the top producer is Sigma-Aldrich at 28.6%. Sigma-Aldrich, a producer of laboratory and reagent chemicals, also headed that category in 1984. Tied with the second best chemical operating profit margin last year at 25.4% were Big Three Industries, which had been fourth the year before, and GAF, which had been seventh in the category in 1984.

Dow Chemical remains the largest company in terms of identifiable chemical assets, with a total of $8.05 billion in 1985. Second, as it was the previous year, is Du Pont, with $7.89 billion in chemical assets. In third place again is Exxon, chemical operations of which include identifiable assets valued at $5.34 billion.

Once again, the company recording the best return on chemical assets (chemical operating profit as a percentage of identifiable chemical assets) is Freeport-McMoRan, at 48.8%. Second best in that category last year was First Mississippi at 45.4%, up from fourth place in 1984. Third best, as the year before, was GAF at 42.6%. Those companies, all of which focus on specialty products, receive a return on assets far higher than that recorded by the larger, commodity chemical producers. Du Pont's return on chemical assets, for example, was 11.0%, and Dow's was just 5.1%, 61st in that ranking. □